desirable applications disclosed herein depend on same, if response speed, reliability and low cost are paramount. Retroreflective material such as scotchlight 7615 is naturally gray appearing and unless brightly colored for ease of further identification, is quite unobtrusive to the user. Indeed it can be colored the color of the portion of the object on which it is provided to make it even more so. (except of course along the path from the light source illuminating same—not seen by the average user except in rare situations).

[0676] Different targets of all sizes can be used, but if the user is to place them, he needs to teach which ones you put where—unless you only put them in specified places which could be pre-entered in a computer program, like green targets on hands, square ones on feet, and so forth.

[0677] Data Base Teach-In

[0678] The datums on an object can be known apriori relative to other points on the object, and to other datums, by selling the object designed using such knowledge (or measured after the fact to obtain it) and including with it a CD ROMdisc or other computer interfacable storage medium having this data. Alternatively, the user for example, can teach the computer system this information. This is particularly useful when the datums are applied by the user on arbitrary objects.

[0679] One can create a simple model of the object by simply using the camera of the invention to acquire a 2D outline of the object on which the target datums can be noted automatically or manally. A more involved 3D digitized model can also be created with the invention, and the datums associated with it

[0680] One can hold the object desired up to the tv camera, and use the computer with a special program to try to find good datums anywhere to use given the natural features (eg a bright spot such as a coat button). If one is found, the object can be moved and the degree of funtion at different ranges and angles determined If satisfactory also photogrammetrically for the calculations of locations and orientations desired, this natural datum can be used, and another found. If artificial ones are required, for example nothing else can be reliably found on the object itself, this requirement can be indicated by the program. Or an alternative activity able to use the less capable datums could be suggested to the user.(eg less angular variation, less motion, closer to camera, cover up a distracting portion (eg a belt buckle having glints), etc.

[0681] Again you would teach the unit what happens in the normal course of operation If for example, a target was obscured, a prompt command can be provided to the use to say move target to new location or suggest that an additional redundant target be placed on the object.

[0682] In the airplane game of **FIG. 5**, Let us say that the user wants to construct his own object, and just puts 3 retroreflective targets (or a triangular or other shaped target also allowing 4-6 degree of freedom solution) on a plane model he purchases at a store. Then having the software which provides a real airplane video and sounds, he enters a teach mode in the program which steps him thru (or automatically sets him up) for the issues here discussed.

[0683] One can input setup information to the computer, for example filling outa table where would be hands, feet, etc. And you can put the object with the target in front of the camera, in a normal position and the thing would be taught if one points it out on the screen, or by other means.

[0684] Standard Activity Frameworks

[0685] It is considered a very useful characteristic of the invention that standard frameworks for activity can be provided by a vendor on software discs or over the internet, which allow the user to easily construct his own activity. This includes for example: instructions on how to attach datums usually provided with the software Instructions on where to place datums, or select natural datums capable of use including tests, by showing the object with natural datum to a camera used for the invention, and the computer running a test program to determine if the TV image obtained is sufficient for use in some desired mode (realizing it might be sufficient for a less movement or less high speed activity, but not for full motion in a variety of positions over a large depth of field).

[0686] The framework can include software for specialized datum detection included with the game kit for example.

[0687] The framework can have software to tailor game or other activity software to the taught in positions and movements of the game player (human, doll, or whatever).

[0688] A diagnostic and optimization program could look at a few examples of use during a warm-up period or even once a game, for example, got going, and then optimize various parameters to suit, such as:

[0689] algorithms for target detection, even varied to suit different portions of the game

[0690] Photogrammetric equations, and their optimization for object position and orientation, even varied to suit different portions of the game

[0691] Lighting related parameters such as LED power, LED pulse time if used, camera integration time, etc. also even varied to suit different portions of the game, and of course to suit the room, distances from the camera and so on. A warning of slow response, for example, could be given if working parameters were not met, so the user could change a condition if he wished.

[0692] As noted above, could suggest final changes to target placement or type for better performance. This could include use of a larger size target in a given location to improve definition, the use of a distinctive shape or color target to improve identification, the use of a retroreflector rather than a plain target (and the associated need for auxiliary lighting along the retroreflector axis), the need for a strong LED target (not preferred for most activity), and so forth

[0693] In addition, the standard program framework could assist the user in construction of the activity itself. For example, the airplane game of **FIG. 5** could have a library of various display and aural options which the user could select to tailor his game as desired. Indeed such program elements could cross from one game type to another (eg the car dash of **FIG. 4** if it were an airplane dash could use the